WE CLAIM:

1. An apparatus for polishing a surface of a workpiece comprising:

a carrier configured to hold the workpiece;

a showerhead, having a non-planar surface, providing a variable gap between the non-planar surface and the surface of the workpiece; and

a polishing pad with a polishing side and a back side positioned within the variable gap and configured to polish the surface of the workpiece with the polishing side when a fluid flow is applied from the non-planar surface to the back side.

2. The apparatus of Claim 1, wherein the fluid flow is applied from a plurality of fluid flow zones formed in the non-planar surface.

3. The apparatus of Claim 1, wherein the fluid flow zones are configured to move to cause a change in the topography of the non-planar surface.

4. The apparatus of Claim 3, wherein the fluid zones move during the polishing of the surface of the workpiece.

5. The apparatus of Claim 1, wherein the non-planar surface has a center high topography.

6. The apparatus of Claim 1,wherein the non-planar surface has a center low topography.

7. The apparatus of Claim 2, wherein at least one of the fluid flow zones is closer to the back side of the polishing pad than the rest of the fluid zones.

8. The apparatus of Claim 2, further comprising ventilation regions between the fluid flow zones.

9. The apparatus of Claim 2, wherein the fluid flow zones are concentric.

10. The apparatus of Claim 2, wherein the fluid flow zones are elongated zones.

11. The apparatus of Claim 1, wherein the fluid flow is applied from a plurality of fluid openings formed in the fluid flow zones.

12. The apparatus of Claim 4, further comprising a feed back circuit that in response to a change in a removal profile induces a change in the topography of the non-planar surface to yield a pre-determined removal profile.

13. The apparatus of Claim 2, wherein each zone includes a variable topography.

14. The apparatus of Claim 1, wherein a polishing solution is delivered onto the polishing sid of the polishing pad during the polishing of the surface of the workpiece.

15. A method of controlling material removal rate from a workpiece surface using a polishing solution, a pad and a shower head with a non-planar surface providing a variable gap between the non-planar surface and the workpiece surface, wherein the pad has a polishing side and a backside, the method comprising the steps of:

holding the workpiece;

placing the polishing pad into the variable gap;

emitting fluid from the non-planar surface onto the backside of the pad to establish pressure;

establishing relative motion between the pad and the workpiece surface, and

removing material from the workpiece surface with the polishing side of the pad.

16. The method of Claim 15, further comprising changing topography of the non planar surface to vary material removal profile from the surface of the workpiece.

17. The method of Claim 15 wherein the step of emitting fluid comprises emitting fluid from a plurality of fluid flow zones placed in the non-planar surface.

18. The method of Claim 15 further comprising the step of sensing a material removal profile during the step of removing and adjusting the variable gap to control the material removal profile.